RIS
SC-1326

# SC-1326

# INSTRUCTION MANUAL

ROCHESTER
INSTRUMENT
SYSTEMS

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ROCHESTER INSTRUMENT SYSTEMS
255 NORTH UNION STREET, ROCHESTER, NEW YORK 14605

# Instrument Installation Guide
# SC-1300 Non-Isolated Voltage/Current Transmitter
# SC-1302 Isolated Voltage/Current Transmitter
# SC-1304, SC-1306 Non-Isolated Millivolt Transmitters
# SC-1326 Isolated Millivolt Transmitter

## Section 1 Unpacking and Inspection

**Scope** — The RIS family of mV/Voltage/Current Transmitters maybe divided into two basic groups. The non-isolated group consisting of the SC-1300, SC-1304 and SC-1306 and the isolated group consisting of the SC-1302 and SC-1326.

Between the SC-1300 (noniso.) and the SC-1302 (iso.) Voltage/Current Transmitters, all standard process input and output signals are made compatible. An inverter capability is available on SC-1302 models.

The SC-1304 mV/Current transmitter will accept input spans from 50mV to 1V with offsets from −50mV to +50 mV. The SC-1306 and SC-1326 transmitters accept 3mV to 100 mV spans with offsets from −25mV to +30 mV.

With the low impedance option, the SC-1306 and SC-1326 will accept current inputs with an input drop of 50mv.

All transmitter outputs may be "live zero" or "zero based."

2 **Unpacking** — Upon receipt of the equipment, perform the following unpacking procedures:

1) Ensure that the container is sealed. If any container is open, notify the carrier and record it on the freight bill.

2) Check the shipment against the packing list to ensure that the shipment received is the correct one. If the shipment is incorrect, notify the carrier and RiS Customer Service.

3) Check container for signs of external damage. Look for dents, protrusions, holes or smashed corners. Record any damage.

4) Open the container and check the contents against the packing list. Record any missing items.

5) If reshipment is contemplated, retain all packing materials.

1-3 **Inspection**

1) Inspect the outside of the equipment for damage such as scratches, dents, etc.

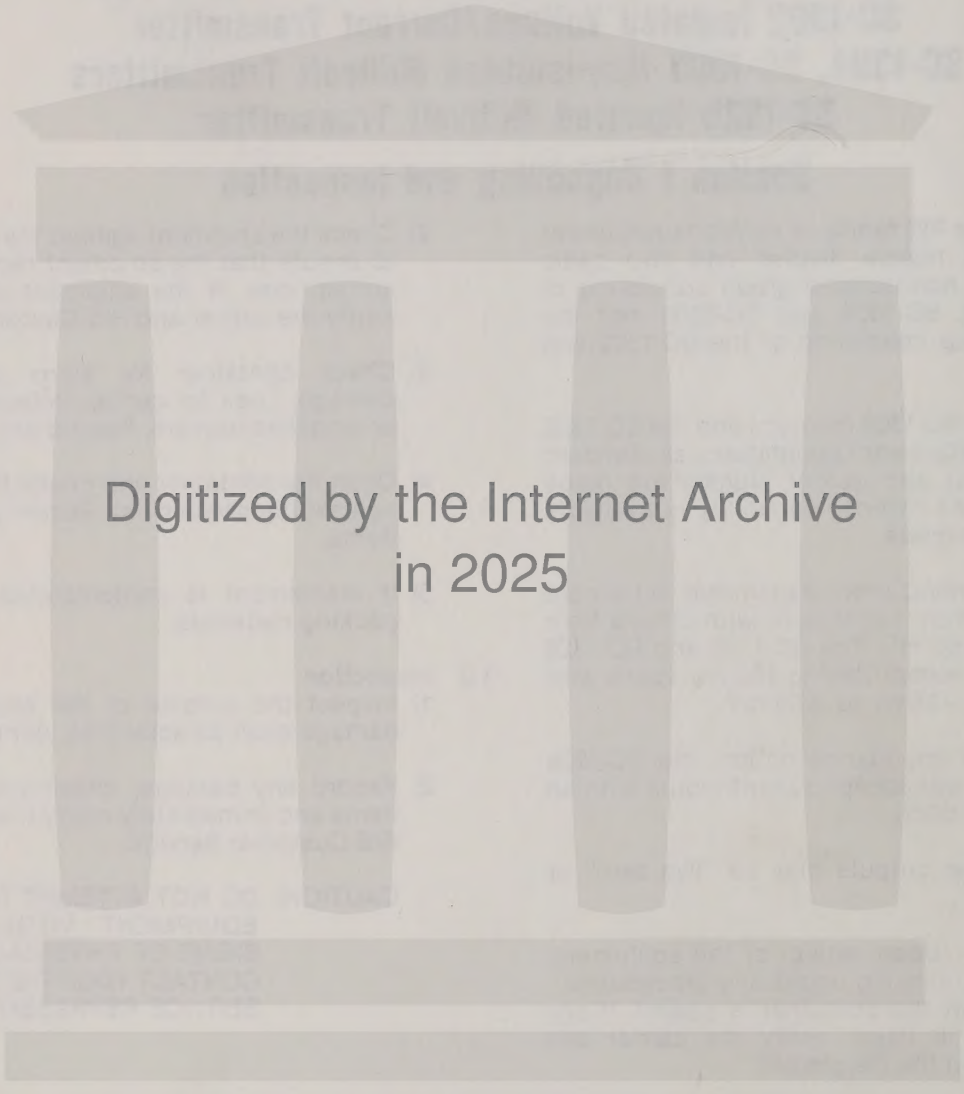
2) Record any damage, missing or incorrect items and immediately notify the carrier and RiS Customer Service.

CAUTION: DO NOT ATTEMPT TO INSTALL EQUIPMENT WITH OBVIOUS SIGNS OF PHYSICAL DAMAGE. CONTACT YOUR RIS CUSTOMER SERVICE REPRESENTATIVES.

## Section 2 Mounting and Installation

1 **Mounting Dimensions** — Mounting dimensions for single unit enclosures are shown in 2-1A. Multiple unit enclosures are designed for mounting in a 19" rack. Single unit enclosures may be flush mounted into a wall or panel. All units may be mounted with number 10 screws.

2-2 **Connections** — Refer to figure 2-2A, or 2-2B for the connection diagram applicable to your particular model. Connection in 2-2A and 2-2B to number 6 screws on the terminal block and can accept a .296 spade, ring lug or up to 14AWG wire. Make certain AC leads have been twisted. Shielded wire is recommended in areas of high electrical noise.



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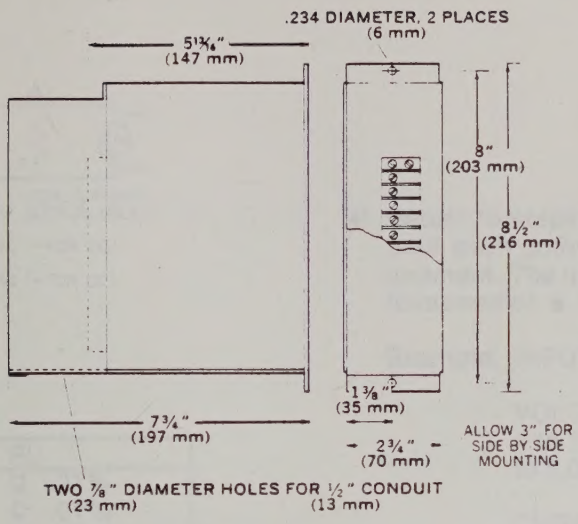



**Figure 2-1A Mounting Dimensions, Single Unit Enclosure**

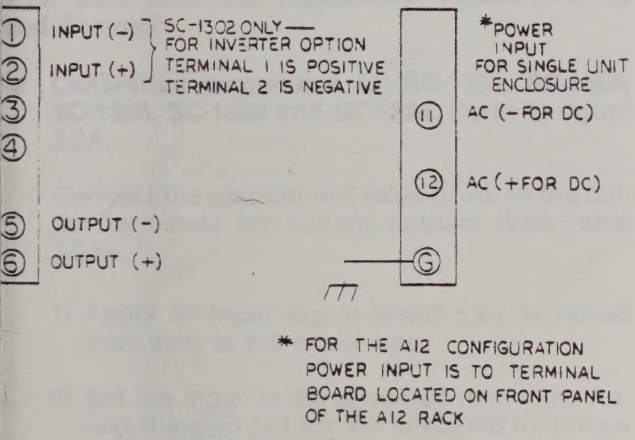

① INPUT (–)
② INPUT (+)
SC-1302 ONLY — FOR INVERTER OPTION TERMINAL 1 IS POSITIVE TERMINAL 2 IS NEGATIVE
③
④
⑤ OUTPUT (–)
⑥ OUTPUT (+)
*POWER INPUT FOR SINGLE UNIT ENCLOSURE
⑪ AC (– FOR DC)
⑫ AC (+ FOR DC)
G
* FOR THE A12 CONFIGURATION POWER INPUT IS TO TERMINAL BOARD LOCATED ON FRONT PANEL OF THE A12 RACK

**Figure 2-2A Input/Output Connections for Voltage/Current, and Millivolt Transmitters. A-12 and Single Unit Enclosure**

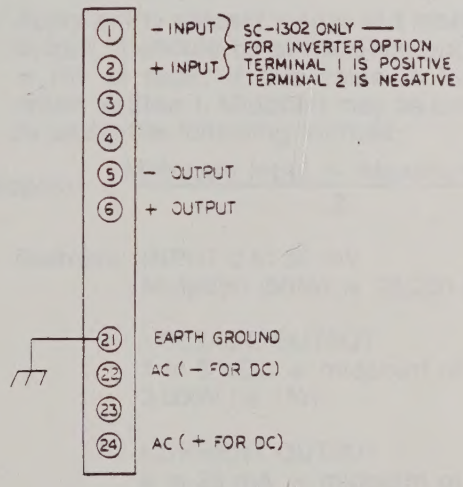

① – INPUT
② + INPUT
SC-1302 ONLY — FOR INVERTER OPTION TERMINAL 1 IS POSITIVE TERMINAL 2 IS NEGATIVE
③
④
⑤ – OUTPUT
⑥ + OUTPUT
㉑ EARTH GROUND
㉒ AC ( – FOR DC)
㉓
㉔ AC ( + FOR DC)

**Figure 2-2B Input/Output Connections for Voltage/Current and Millivolt Transmitters, P11 Configuration**

# Section 3 Calibration

3-1 **General** — Field wiring which may interfere with the field calibration equipment, or cause false alarms or overscale conditions to occur should be removed during this field calibration procedure. This field wiring should not be reconnected until the field calibration is complete and all calibration equipment removed.

3-1.1 Detailed calibration instructions are contained in the following paragraphs. If the unit fails to operate within the prescribed parameters it should be returned to the factory.

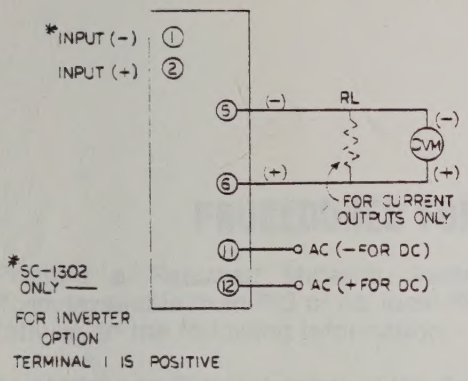
3-2 **Calibration Equipment** — The following items will be needed to perform the calibration procedures:

1) Power supply AC or DC as required.

2) Digital voltmeter (3 1/2 digit minimum, 4 1/2 digit preferred).

3) Precision mV, voltage or mA calibration source.

Refer to table 3-2A for proper output resistance shunting values:




**igure 3-2A Test Set-up**

| OUTPUT | RL |
|---|---|
| 4-20 mA | 250 Ω .01% |
| 1-5 mA | 1000 Ω .01% |
| 10-50 mA | 100 Ω .01% |
| 0-10 mA | 500 Ω .01% |
| 0-1mA | 5K Ω .01% |

**able 3-2A Shunting Resistance Values (Output oad Resistor)**

-3 **Calibration procedures for SC-1300, SC-1304, SC-1306, SC-1302 and SC-1326.** Refer to figure 3-2A.

Connect the appropriate value of RL to the output terminals for current outputs (See Table 3-2A).

1) Apply an input signal which can be varied from zero to full scale input.

2) Set the input to the specified minimum. Adjust the zero pot for the specified minimum output. If the output is zero based, set the input to 10% and adjust the zero pot for 10% output.

3) Apply the full scale input signal and adjust the span control for the desired full scale output.

4) Return to steps 2 and 3 and adjust controls until each point checks without further adjustment. The unit should be calibrated to a tolerance of ±.1% of the input span.

Example: INPUT 0 to 50 mV

VOLTAGE OUTPUT
1 to 5 VDC = 1.000 (±.004)
to 5.000 (±.004)

CURRENT OUTPUT
4 to 20 mA = 4.000 (±.016 mA)
to 20.00 (±.010 mA)

5) Apply a fifty percent signal and monitor the output. It should be at midpoint and within ±.1% of span. If this value is incorrect, return to Step 1. Midpoint may be computed by using the following formula:

$$\text{Midpoint} = \frac{\text{Minimum Input} + \text{Maximum Input}}{2}$$

Example: INPUT 0 to 50 mV
Midpoint (50%) = 25.000 mV

VOLTAGE OUTPUT
1 to 5 VDC = midpoint of
3.000V (±.1%)

CURRENT OUTPUT
4 to 20 mA = midpoint of
12.000 mA (±.1%)

6) Allow the unit to operate for 5 minutes. Recheck steps 2, 3 and 5.

3-3.1 **Inverter Option, SC-1302.** Refer to the following procedures to properly calibrate SC-1302 units equipped with the inverter option.

1) Apply fullscale input and adjust the zero pot for minimum output. (± .1%).

2) Apply minimum input and adjust the span pot for fullscale output (± .1%).

3) Repeat steps 1 and 2 until the above conditions are met.

# PROCEDURES FOR FACTORY REPAIR AND RETURN

A. Prepare a Returned Material Authorization Form (available from RiS or its' local Representative)with the following information.

1. Model and Serial Number of the Equipment
2. The failure symptom — BE SPECIFIC
3. The operating environment, i.e., Indoor/ Outdoor, approximate temperature, vibration, dusty conditions, etc.
4. Approximate date of installation or number of operating hours.
5. The site name and address of the failed equipment.
6. Complete shipping information for the return of the equipment if other than the operating site.
7. Name of person, and telephone number to contact if questions arise.

B. Enclose above information with the device and pack the equipment in a commercially accepted container with sufficient packing material to insure that no shipping damage will occur.

Ship the Equipment to appropriate location:

Attention: REPAIR DEPARTMENT

ROCHESTER INSTRUMENT SYSTEMS, INC.
255 North Union Street
Rochester, New York 14605
(716) 263-7700 Telex: 978457 Cable: RISROCNY

ROCHESTER INSTRUMENT SYSTEMS, LTD
Maxim Road
Crayford, Kent
DA1 4BG, United Kingdom
Telephone: Crayford 526211
Telex: 27831 Telegrams: RiSCom Dartford

ROCHESTER INSTRUMENT SYSTEMS, LTD.
915 Kipling Avenue
Toronto M8Z 5H4 Canada
(416) 233-6218 Telex: 06 967801

IN THE MIDDLE EAST:
For skilled on site servicing and commissioning contact our factory trained technicians at:

SISCO
Saudi Industrial and Technical Services Co.
P.O. Box 319
DHARAN AIRPORT
SAUDI ARABIA
Telephone: 895-5032. Telex: 671311 SIS SJ

C. Your equipment will be tested, repaired, and inspected at the factory. Normal factory turnaround in ten days or less (excluding shipping time).

D. For emergency service or repair status information please contact appropriate RiS Instrument Customer Service Department or your local RiS Representative.

**WARRANTY** — RiS warrants equipment of its own manufacture to be free from defects in material and workmanship, under normal conditions of use and service, and will replace any component found to be defective, on its return to RiS, transportation charges prepaid, within one year of its original purchase. RiS will extend the same warranty protection on accessories which is extended to RiS by the original manufacturer. RiS also assumes no liability, express or implied, beyond its obligation to replace any component involved. Such warranty is in lieu of all other warranties express or implied.

RiS **ROCHESTER INSTRUMENT SYSTEMS**
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Maxim Road, Crayford, Dartford, Kent DA1 4BG U.K. Telephone: Crayford 526211 Telex: 27831 Telegram: RiSCom Dartford

915 Kipling Avenue, Toronto M8Z 5H4, Canada Telephone: (416) 233-6218 Telex: 06 967801

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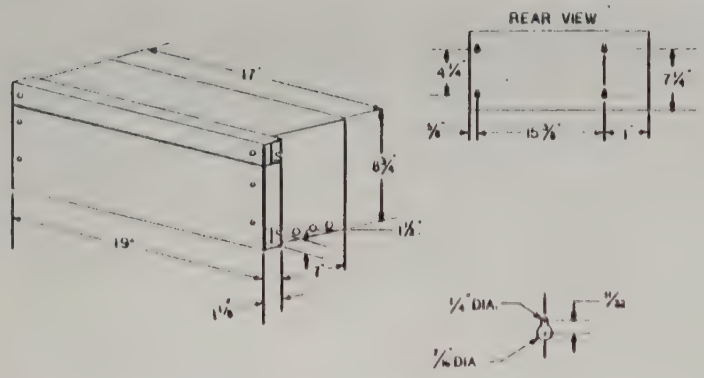
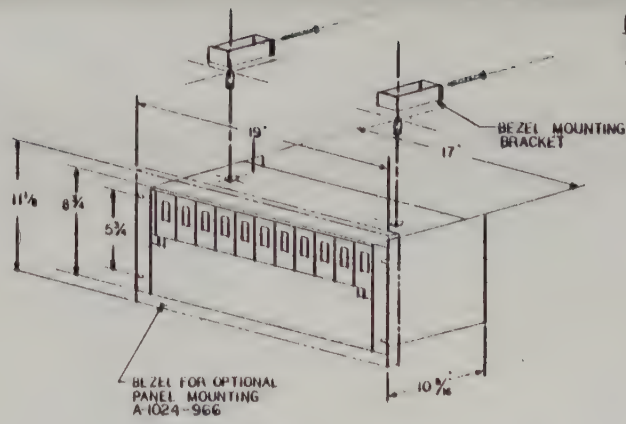
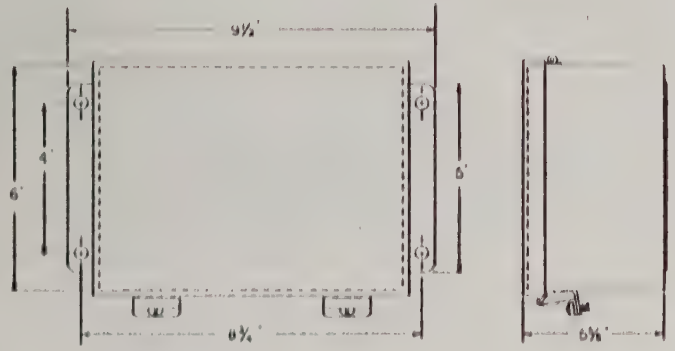



A-12 PLUG-IN MULTIPLE UNIT ENCLOSURE

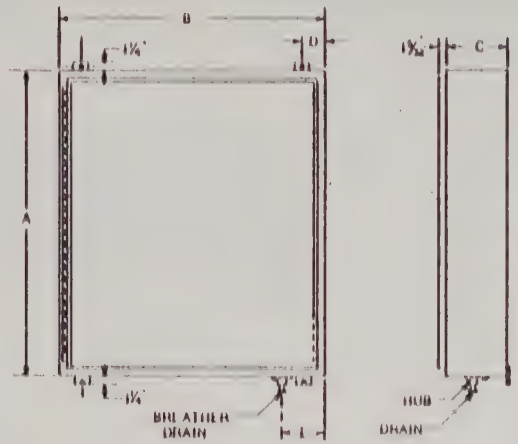
NOTE: FOR 24VDC OPERATION USE 3AMP FUSE
FOR 117VAC OPERATION USE 1.5AMP FUSE




P-11 PLUG-IN MULTIPLE ENCLOSURE



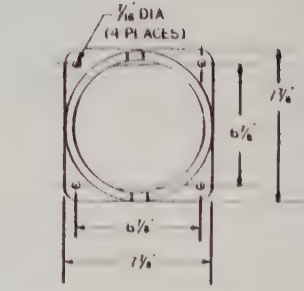

NEMA UNITS 4&12

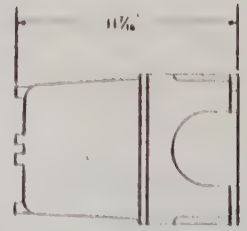



MULTIPLE UNIT ENCLOSURE NEMA 4&12 HOLDS FROM 2 TO 26 UNITS EXACT VALUES OF 'A' & 'B' DIM DEPENDENT ON TOTAL NUMBER OF UNITS ENCLOSED SEE TABLE

| CABINET SIZE A | B | C | D | E | PANEL SIZE HIGH | WIDE | MAX NO UNITS |
|---|---|---|---|---|---|---|---|
| 16 | 8 | 6 | 12 | 14 | 13 | 9 | 2 |
| 16 | 8 | 8 | 12 | 14 | 13 | 13 | 4 |
| 20 | 8 | 6 | 16 | 18 | 17 | 9 | 3 |
| 20 | 8 | 8 | 16 | 18 | 17 | 13 | 6 |
| 24 | 8 | 6 | 20 | 22 | 21 | 9 | 4 |
| 24 | 8 | 8 | 20 | 22 | 21 | 13 | 8 |
| 30 | 8 | 6 | 26 | 28 | 27 | 9 | 5 |
| 30 | 8 | 8 | 26 | 28 | 27 | 13 | 10 |
| 36 | 8 | 6 | 32 | 34 | 33 | 9 | 6 |
| 36 | 8 | 8 | 32 | 34 | 33 | 13 | 12 |
| 42 | 8 | 6 | 38 | 40 | 39 | 9 | 7 |
| 42 | 8 | 8 | 38 | 40 | 39 | 13 | 14 |
| 48 | 8 | 6 | 44 | 46 | 45 | 9 | 8 |
| 48 | 8 | 8 | 44 | 46 | 45 | 13 | 16 |
| 60 | 8 | 6 | 56 | 58 | 57 | 9 | 10 |
| 60 | 8 | 8 | 56 | 58 | 57 | 13 | 20 |
| 72 | 8 | 6 | 68 | 70 | 69 | 9 | 12 |
| 72 | 8 | 8 | 68 | 70 | 69 | 13 | 24 |
| 84 | 8 | 6 | 80 | 82 | 81 | 9 | 14 |
| 84 | 8 | 8 | 80 | 82 | 81 | 13 | 26 |

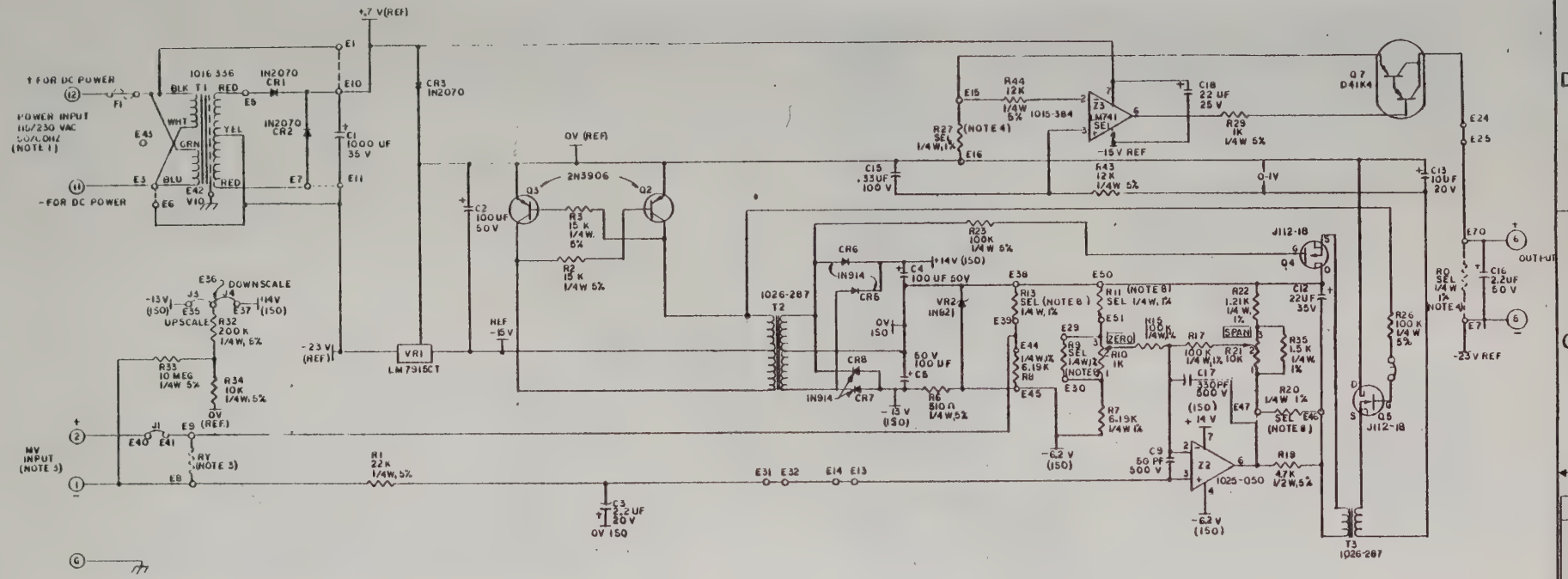
MULTIPLE UNIT NEMA ENCLOSURE




EXPLOSION PROOF HOUSING

ATTACHMENT A - ET-1200, SC 1300 SERIES ENCLOSURES




NOTES:

1. POWER AND FUSE OPTIONS:
   - A. FOR 115 VAC OPERATION, WIRING LIST 'A' (FUSE NO. 0620-354(.15 A.))
   - B. (SUFFIX H2) FOR 230 VAC OPERATION, WIRING LIST 'B' (FUSE NO. 0620-354(.15A))
   - C (SUFFIX H) 24 VDC OPERATION, NON ISOLATED, WIRING LIST 'C' (FUSE NO. 6006-204 (1/4A))
   - D. (SUFFIX I) FOR 24 VDC OPERATION, ISOLATED, WIRING LIST 'E' (FUSE NO. 6006-204 (1/4A))
   - E. (SUFFIX II) FOR 48 VDC OPERATION, ISOLATED, WIRING LIST 'D' (FUSE NO. 6006-204 (1/4A))

   A12 OR P1 HOUSING OPTIONS
   - F. (H3) 115 VAC 10% 60 HZ ONLY WIRING LIST 'F' (FUSE NO. 0620-354(.15A))
   - G. (H4) 115 VAC 10% 50/60 HZ WIRING LIST 'A' (FUSE NO. 0620-354(.15A))
   - H. (H5) 230 VAC 10% 50/60 HZ WIRING LIST 'B' (FUSE NO. 0620-354(.15A))
2. UNIT IS NORMALLY SUPPLIED WITH J4 FOR DOWNSCALE PORTECTION FOR UPSCALE PROTECTION REMOVE J4 AND ADD J3.
3. INPUT SIGNAL OPTION: SEE NOMOGRAM AND L2 OPTION.
4. OUTPUT OPTION
   - A. VOLTAGE OUTPUT MAY BE OBTAINED BY ADDING THE APPROPRIATE SHUNT TO THE 4-20MA CURRENT OUTPUT. SEE THE OUTPUT CHART DETAILING THIS INFORMATION.
5. HIGH LOOP DRIVE OPTION 'HO'
   - A. ADD MODULE A-1030-643
   - B. WIRE PER WIRING LIST G
6. TRUE VOLTAGE OUTPUT OPTION VO 5VDC FULL SCALE OUTPUT
   - A. ADD MODULE A-1030-641
   - B. REMOVE LUG FROM TERM 6 ON MAIN PCB.
   - C. REMOVE R0 FROM MAIN PCB. IF INSTALLED.
   - D. WIRE PER WIRING LIST 'H'
   - E. FOR 10VDC FULL SCALE OUTPUT JUMPER E109 & E110 ON MODULE A-1030-641.
7. 'P' OPTION-REMOVE TERMINAL BLOCK LUGS (MAIN PCB) FROM TERMS 5 & 6. SCREWS ARE TO BE RETAINED AFTER RING LUGS ADDED.
8. SEE NOMOGRAM FOR VALUE SELECTION OF R9, R11, R13, R2Q. (PG 3)

| REV | DESCRIPTION | CHK | APPR |
|---|---|---|---|
| S | DCO-003711 6-1-84 EMB | LAY | EJ |

| REV | DESCRIPTION | CHK | APPR |
|---|---|---|---|
| R | DCO-001685, WO 5-16-84 | LAY | EJ |
| P | DCO-003212, 3246 | LAY | EJ |
| N | DCO-002004 11-17-82 | MLL | WEB |
| | REDRAWN, NO CHANGE. BP | L-82 | EJ |

| REV | DESCRIPTION | CHK | APPR |
|---|---|---|---|
| M | DCO 1169 AW 2-11-82 | 2-82 | PSR |
| L | DCO-957 BLK 11-24-81 | 11-81 | MEB |
| K | DCO-001028 HBL 11-9-81 | 11-81 | PR |
| J | DCO 000124 JRG 6-3-81 | 6-81 | GF |

| REV | DESCRIPTION | CHK | APPR |
|---|---|---|---|
| H | DCO SC-946 KEN 12-8-80 | 2-81 | LLT |
| G | DCO SC839 PM FLY 2-2-80 | 2-80 | MEB |
| F | REF D-1018 666 | — | — |
| E | UPDATE PER D0588 | — | — |

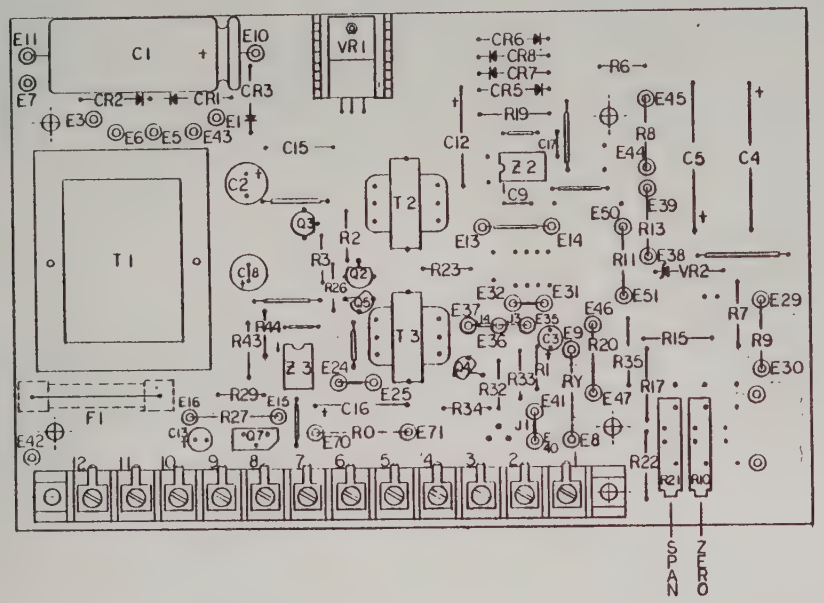
B/M A-1044-041

DILLON 7-5-79
DILLON
JMW 12-9-79
MSC 12-11-79

SCHEMATIC & ASSY, ISOLATED MILLIVOLT TRANSMITTER SC-1326

ROCHESTER INSTRUMENT SYSTEMS
500 SOUTH UNION STREET ROCHESTER, NEW YORK 14609
210 KYLEMORE AVE TORONTO M4G 3M8, CANADA
MAILING RD CRAYFORD DARTFORD KENT DA1 4BD U.K.

SCALE —
DWG NO D-1030-694
REV 6
SHT 1 OF 5




| 115VAC WIRING LIST 'A' | |
|---|---|
| FROM | TO |
| TI BLK | E1 |
| GRN | E1 |
| BLU | E3 |
| WHT | E3 |
| RED | E5 |
| YEL | E6 |
| RED | E7 |
| TI VIO | E42 |

| I SUFFIX 24VDC (ISO) WIRING LIST 'E' | |
|---|---|
| FROM | TO |
| A-1014-613 | |
| E17 | E1 |
| E18 | E3 |
| E8 | E10 |
| E9 | E11 |

| 115VAC WIRING LIST 'F' | |
|---|---|
| FROM | TO |
| TI BLK | E1 |
| BLK | E3 |
| RED | E5 |
| YEL | E6 |
| TI RED | E7 |

| HIGH LOOP DRIVE OPTION 'HO' WIRING LIST 'G' | | | |
|---|---|---|---|
| FROM A-1030-643 | TO | AWG | COLOR |
| E101 | E10 | 22 | RED |
| E102 | E11 | 22 | BLK. |
| E103 | E25 | 22 | ORN. |
| E104 | E24 | 22 | BRN |

NOTE: DELETE EXISTING JUMPERS FROM PCB BETWEEN E24 & E25.

| H2, H5 SUFFIX WIRING LIST 'B' 230VAC | |
|---|---|
| FROM | TO |
| TI BLK. | E1 |
| BLU. | E3 |
| WHT. | E43 |
| GRN. | |
| VIO. | E42 |
| RED | E5 |
| YEL. | E6 |
| TI RED | E7 |

| TRUE VOLTAGE OUTPUT OPTION 'VO' WIRING LIST 'H' | | | |
|---|---|---|---|
| FROM A-1030-641 | TO | AWG | COLOR |
| E105 | E10 | 22 | RED |
| E106 | E11 | 22 | BLK. |
| E107 | E70 | 22 | ORN. |
| E108 | E71 | 22 | BRN. |
| E111 | TERM 6 | 22 WITH RING LUG | YEL. |
| E112 | TERM 5 | 22 WITH RING LUG | GRN. |

| H SUFFIX WIRING LIST 'C' 24VDC | | |
|---|---|---|
| FROM | TO | WIRE |
| E1 | E10 | # 22 |
| E3 | E6 | 22 |
| E7 | E11 | 22 |

| 'P' OPTION WIRE LIST 'I' | | | |
|---|---|---|---|
| FROM MAIN PCB | TO AUX MODULE | AWG | COLOR |
| E10 | E105 | 22 | RED |
| E11 | E114 | 22 | BLK. |
| TERM 6 | E108 | 22 WITH RING LUG | BRN. |
| TERM 5 | E109 | 22 WITH RING LUG | ORN. |
| E70 | E115 | 22 | YEL. |
| E71 | E116 | 22 | GRN. |

NOTE 7

| TI SUFFIX WIRING LIST 'D' 48VDC (ISOLATED) | | | |
|---|---|---|---|
| FROM 1042-567 | TO | AWG | COLOR |
| E17 | E1 | 22 | RED |
| E18 | E3 | 22 | BLK. |
| E8 | E5 | 22 | ORN. |
| E9 | E6 | 22 | BRN. |

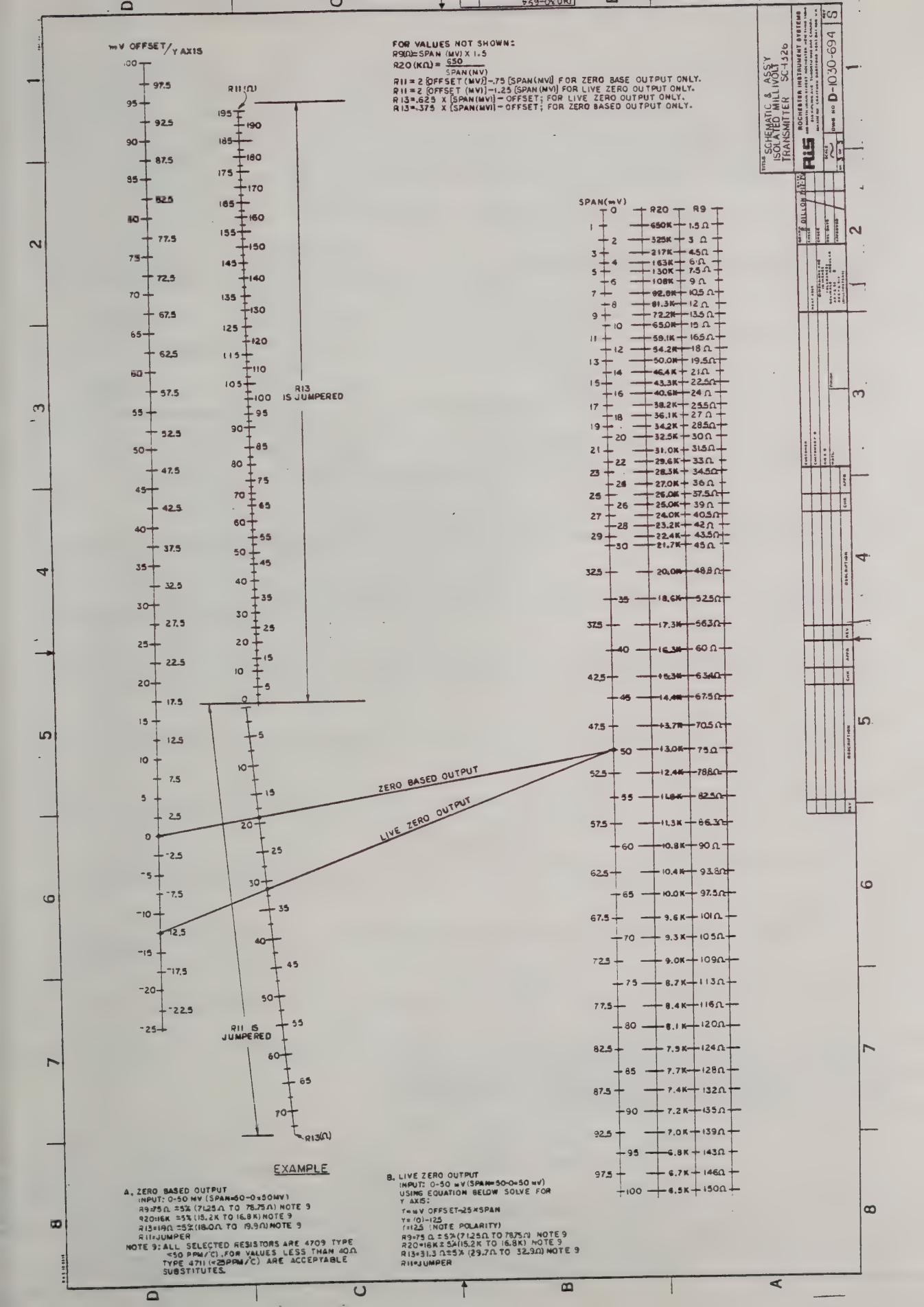
| OUTPUT CHART (NOTE 4) | | | | | | |
|---|---|---|---|---|---|---|
| ZERO BASED OUTPUT | R0 | RIS / PN | R27 | RIS / PN | LIVE ZERO OUTPUT |
| 0.4-20MA | — | — | 49.9Ω | 4709-090 | 4-20MA |
| 0-10V | 499Ω | 4709-206 | | | 2-10V |
| 0.1-5V | 249Ω | 4709-169 | | | 1-5V |
| 0-1V | 499Ω | 4709-090 | | | .2-1V |
| 0-100MV | 5.1Ω | 4711-050 | | | 20-100MV |
| 0-10MV | 0.5Ω | 4711-136 | 49.9Ω | 4709-090 | 2-10MA |
| 0.1-5MA | — | — | 200Ω | 4709-160 | 1-5MA |
| 0.10-50MA | — | — | 205Ω | 4711-113 | 10-50MA |
| 0-10MA | — | — | 100Ω | 4709-125 | 2-10MA |
| 0-1MA | — | — | 1KΩ | 4709-248 | 2-1MA |

| LZ OPTION (NOTE 3) | | | | |
|---|---|---|---|---|
| INPUT CHARTS (NOTE 3) | | | MV OFFSET | SPAN |
| INPUT | RY | RIS / PN | VALUE ON NOMOGRAM | |
| 0-5 MA | 10Ω | 4711-081 | 0 | USE 50 MV SPAN ON NOMOGRAM (PG.3) |
| 1-5 | 12.4Ω | 4711-084 | 12.4MV | |
| 0-10 | 5.1Ω | 4711-050 | 0 | |
| 2-10 | 6.5Ω | 4711-060 | 13MV | |
| 0-20 | 2.5Ω | 4711-040 | 0 | |
| 4-20 | 3Ω | 4711-078 | 12.5MV | |
| 0-50 | 1.25Ω | 4711-114 | 0 | |
| 10 50MA | 1.25Ω | 4711-114 | 12.5MV | |
| 0-1MA | 499Ω | 4709-090 | 0 | |

TITLE: SCHEMATIC & ASSEMBLY ISOLATED MILLIVOLT TRANSMITTER SC1326

ROCHESTER INSTRUMENT SYSTEMS

DWG NO D-1030-694 REV S




EXAMPLE

A. ZERO BASED OUTPUT
INPUT: 0-50 MV (SPAN=50-0=50MV)
R9=75Ω ±5% (71.25Ω TO 78.75Ω) NOTE 9
R20=16K ±5% (15.2K TO 16.8K) NOTE 9
R13=18Ω ±5% (18.0Ω TO 19.9Ω) NOTE 9
R11=JUMPER
NOTE 9: ALL SELECTED RESISTORS ARE 4709 TYPE <50 PPM/°C). FOR VALUES LESS THAN 40Ω TYPE 4711 (<25PPM/°C) ARE ACCEPTABLE SUBSTITUTES.

B. LIVE ZERO OUTPUT
INPUT: 0-50 mV (SPAN=50-0=50 mV)
USING EQUATION BELOW SOLVE FOR Y AXIS:
Y = mV OFFSET - 25 × SPAN
Y = 0 | -12.5
(NOTE POLARITY)
R9=75 Ω ±5% (71.25Ω TO 78.75Ω) NOTE 9
R20=16K ±5% (15.2K TO 16.8K) NOTE 9
R13=31.3 Ω ±5% (29.7Ω TO 32.9Ω) NOTE 9
R11=JUMPER

# EQUIVALENT COMPONENT REFERENCE GUIDE

Due to conditions beyond our control, it may be necessary to substitute a different part for one called out on the documentation. The use of such an alternate component, which may or may not appear in your product, is covered in the following table. Unless a specific manufacturer is named, the part number is understood to be an industry standard (generic) identification.

| Original Part Number | Component Description | Alternate #1 | Alternate #2 |
|---|---|---|---|
| 1N2070 | Diode 400V, 1A | 1N4004 | |
| 1N914 | Diode 75V, 0.2A | 1N4148 | |
| 20F40 | Diode 400V, 20A | MR-2004S | |
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ROCHESTER INSTRUMENT SYSTEMS
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915 KIPLING AVE., TORONTO M8Z 5H4 CANADA
MAXIM RD., CRAYFORD, DARTFORD, KENT DA1 4BG, U.K.

0004223 11/13/84 MCE
04017 9/19/84 sdb MES
AN RELEASE
DESCRIPTION CHK.
REVISIONS

TITLE Equivalent Component Reference Guide

DRAWN | CHECKED | DRAWING NO. A-1052-675

APPR. W. Taylor 5-23-84 | SHEET 1 OF 1

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